DIW Berlin

German Institute
for Economic Research

Discussion Papers

380

Björn Frank

Location decisions in a changing labour market environment

Berlin, November 2003

Opinions expressed in this paper are those of the author and do not necessarily reflect views of the Institute.

DIW Berlin

German Institute
for Economic Research

Königin-Luise-Str. 5
14195 Berlin,
Germany

Phone +49-30-897 89-0
Fax +49-30-897 89-200

www.diw.de

ISSN 1619-4535

Location decisions in a changing labour market environment

Björn Frank[✉],

German Institute for Economic Research (DIW Berlin)

November 2003

Abstract

We study the location of various film-related services (such as camera rental, casting agencies or pyrotechnic services), the main determinant of interest being the human capital specificity. We show that firms which supply services with a lower firm specificity locate farther away from one another, and argue that it can be concluded that the "poaching" argument (fear of employees leaving for a competitor in large regional labour markets) has greater practical weight than the Marshallian labour pooling mechanism

JEL classification: J41, J63, L82, R30

Keywords: agglomeration, film industry, flexible specialisation, labour pooling, poaching, regional labour markets, turnover

✉ Address: DIW (German Institute for Economic Research), 14191 Berlin, Germany, bfrank@diw.de. I am indebted to Hella Steinke and Manfred Schmidt for superb research assistance and to Kurt Geppert, Michael Pflüger, Julio Robledo, Rainer Voßkamp and an anonymous referee of the DIW's discussion paper series for very helpful comments on an earlier draft.

1. Introduction

The New Economic Geography has emphasised three major forces behind regional sectoral agglomeration: pecuniary externalities, such as local availability of suppliers for specific intermediate goods, technological externalities such as knowledge spillovers or common use of infrastructure, and labour pooling - i.e. an attractive reservoir of potential employees. However, just as technological externalities might become negative if too many firms locate too close to one another, the labour market might also provide *dis*incentives for agglomeration due to poaching. A Chamber of Commerce manager of a prosperous town is quoted as saying: "We've got some companies asking us to stop recruiting companies", as more firms moving into the town from outside the region would increase competition for workers (Wirtz, 2002).

Hence there is a trade-off between pooling and poaching. How does this trade-off react to a changing labour market environment - or more specifically, to a changing worker mobility? It has recently been argued by labour economists that human capital specificity is decreasing (e.g., Lindbeck and Snower, 2000). One reason might be the increased flexibility of computer technologies which can be used across different firms and industries - hence new employees are very soon familiar with the environment at their new workplace. While it is clear that this should result in a higher worker mobility between firms, the question remains: what are the possible effects on firms' location decisions and on the spatial organisation of industries?[1] Would these labour market changes drive agglomeration or disagglomeration? In this paper we argue that this is not at all clear ex ante, and we provide a first empirical investigation.

Section 2 sets out the main hypotheses. For an empirical investigation of these, we use data from our own survey of firms providing film related services, which are highly suited to our purpose for the reasons described at the beginning of section 3. Section 3.3 and 3.4 present the main results, section 4 concludes.

[1] The literature I know of only investigates very different consequences of a changing human capital specificity, notably internal work organisation (Lindbeck and Snower, 2000), centralised wage bargaining (Lindbeck and Snower, 2001) and wage inequality (Aghion, Howitt and Violante, 2002).

2. Hypotheses on the interaction of the labour market and location

Firms belonging to the same industry often cluster in certain regions, for a number of reasons usually discussed in regional economics as " localisation economies". One of the most prominent of these is the "labour market pooling" argument: it makes sense for firms to locate where vacancies can be filled by experienced workers who do not have to move when they take a new job. The way Alfred Marshall makes this point is often quoted, but it is worth repeating here:

"Employers are apt to resort to any place where they are likely to find a good choice of workers with the special skill which they require; while men seeking employment naturally go to places where there are many employers who need such skill as theirs and where therefore it is likely to find a good market."[2]

This way of thinking about labour markets in agglomerations also leads to:

Hypothesis 1: The turnover rate is higher in (sectoral) agglomerations.

Note that the matter of causality is not clear here: some firms might have a high "natural" turnover rate, as they work more than others on a project-by-project basis, creating temporary "adhocraties" (Mintzberg, 1979, ch.21; Benhamou, 2000, p.313). Needing to hire their staff accordingly, they should want to locate in agglomerations. On the other hand, firms in agglomerations might experience a high turnover rate, as their employees change from one employer to another more easily. In any case, finding no support for hypothesis 1 would cast some doubt on the labour pooling argument.

Whether they have to move or not is not the only determinant of the employees' inclination to change their position. How easily they can do that also depends on the specificity of their human capital, i.e. how much of their productive knowledge and abilities is lost when they move from one firm to another (even within the same industry).

Note that the amount and the specificity of human capital do not correlate perfectly. For example, new blue-collar workers with low education might need to receive intensive firm-specific training. On the other hand, human capital may be high but easily transferable if firms tailor their products and services individually for their customers, with a production-specific routine being unlikely to play a major role. Nevertheless, the amount of human capital is still used as a proxy variable for its specifity in some empirical investigations (e.g.,

[2] Marshall (1890), Book IV Chapter X, quoted from the online edition at http://www.socsci.mcmaster.ca/~econ/ugcm/3ll3/marshall/prin/prinbk4.

Alecke, Alsleben, Scharr and Untiedt, 2003); this is just a last resort, which should be used only if, in contrast to our investigation, no better data are available.

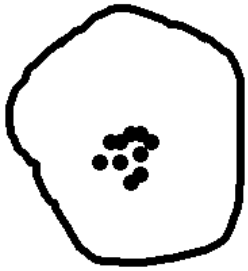
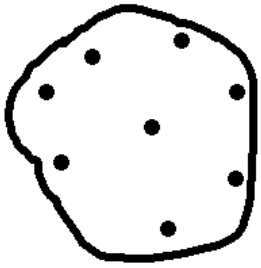
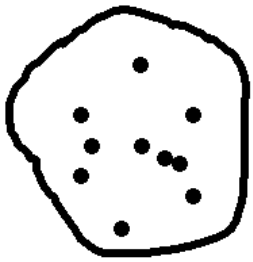
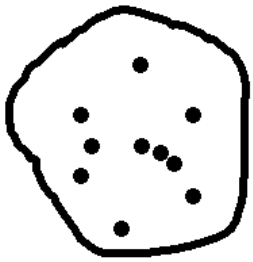
One of the reasons why human capital specificity is important for location decisions is the following: "Since knowledge is partly embodied in workers, flows of workers can be associated with flows of knowledge so that poaching workers is a way for firms to raise their productivity." (Combes and Duranton, 2001, p.2)

The term "poaching" is coined to indicate that this is a real concern for firms. It would be less of a problem if they could simply fill the position with new employees who have to pay for the firm specific training themselves (or accept appropriately reduced wages as long as their productivity is lower than that of their incumbent colleagues). However, Margaret Stevens has convincingly shown that firms with some labour market power, who pay a wage below the worker's marginal product, do have an incentive to increase their workers' productivity through providing training of skills, even if they are transferable[3].

Hence a high tunrover rate might be undesirable, and locating where not many other firms of the same industry are waiting to poach workers might be a reasonable counter-strategy. Obviously the "labour pooling" argument and the "poaching" argument, plausible as both may be, work in opposite directions. When trying to assess empirically which argument is stronger, or more relevant, we make use of the fact that both work only if human capital is not completely firm-specific. Figure 1 illustrates this point. Starting with the lower row, presume for the moment that workers would lose their human capital completely if they moved from one firm to another. Then a labour market pool is not something which would make a location more attractive, and poaching would not be an issue. Whether generally the pooling mechanism is decisive or whether the poaching argument dominates, in this industry "B" the location of firms (represented by the dots in Figure 1) would be completely determined by some other factors.

[3] However, the amount of general training will be suboptimal from a social point of view, due to the positive (poaching) externalities they generate (Stevens, 1996). Other possible reasons why firms pay for general training are discussed in Betcherman, Leckie and McMullen (1998), p.4, Acemoglu and Pischke (1998), Autor (2001) and Cappelli (2002).

Figure 1: Pooling versus poaching

	(only) pooling relevant	(only) poaching relevant
Industry A: workers changing easily from firm to firm		
Industry B: immobile workers		

Now think of industry A as being very similar to industry B, with the only difference being that workers can easily (i.e. without losing any of their human capital or productivity) change from one firm to another. Furthermore, presume for the moment that *only* the labour market pooling argument is relevant. Then all firms should locate closely together, as illustrated in the upper left cell in Figure 1. On the other hand, if *only* the poaching argument were relevant for the firms, they would move to locations where they are regional labour market monopsonists (upper right corner of Figure 1).

Of course, the first row in Figure 1 illustrates extreme polar cases, but comparing it to the second row demonstrates the following point: the specificity of human capital has an impact on firms' location decisions. Generalizing a bit, we now allow for a worker's human capital to be *partly* specific. Then the arguments discussed so far take the form of the following two hypotheses.

Hypothesis 2a: Comparing industries with different levels of human capital specificity, those with higher human capital specificity tend to be *less* concentrated in space, ceteris paribus.

If we find support for hypothesis 2a, this could be interpreted as support for the Marshallian labour market pooling theory. If the poaching argument dominates, however, we should find support for the following

Hypothesis 2b: Comparing industries with different levels of human capital specificity, those with higher human capital specificity tend to be *more* concentrated in space, ceteris paribus.

It is impossible to decide between hypotheses 2a and 2b without empirical work. A first step in this direction is taken with the study presented in the next section.

3. An Empirical Assessment

3.1. Background: The motion pictures industry

A highly disaggregated industry structure, sometime referred to as "flexible specialization" (Piore and Sabel, 1984), is important for very differentiated goods or project-by-project services, as it allows a flexible choice of input suppliers who use more or less flexible general-purpose technologies. Film production is a prime example; it served as a case study for flexible specialization in Scott (1984), Storper (1989) and Storper and Scott (1990), for example. The main reason for the attention which has been paid to the movie industry in this stream of literature is probably that it is an extreme case, allowing the study in a rather pure form of what is expected still to come in other industries. Our reason for studying film production is simply this: It is extremely disaggregated in the sense that many different services needed for film production are carried out in separate firms, and for each of these services, local concentration can be observed. It would be much more difficult to isolate the impact of human capital specificity in a study on a wide range of industries with very different technologies and needs with respect to location.

However, the German movie industry would not be very suitable for our purposes if its local sectoral concentration were as extreme as it is in Hollywood. Fortunately (for us, not for the German film producers), there is not one German centre for film production, but four: Berlin, Cologne, Hamburg and Munich. And only about 60 percent of the industry is actually located in these four "centres".. Thus, we observe firms, or services, which tend to agglomerate, and firms which do not.

3.2. Empirical Strategy and Data

The motivation for our study and the related thought experiments in sections 1 and 2 above refer to the effects of changes (in the labour market) over time. However, we are using a cross-sectional data set. The underlying idea is this: rather than observing one case of a changing human capital specificity and the effect on firms' location over time, we try to

observe the different film related services with a different human capital specificity at one time. If local concentration differs accordingly, then either hypothesis 2a or 2b is supported, and we can infer what the likely consequences of a change of the independent variable over time would be.

While local concentration can be measured by using an industry address book (Kay Publishing 2001), a proxy variable for human capital specificity had to be collected in a survey of these firms[4]. In spring 2002, 2642 producers[5] of film-related services (frs) were contacted; 436 responded (response rate 16.5%). The responding firms belonged to 79 different services, typically offering just one service, such as animal training, pyrotechnics, sound editing, dubbing, camera rental, film-specific legal services, miniature design, makeup, casting, carpentry, etc.[6]

For those 60 services which are offered by at least 10 firms, including those that did not answer, an adjusted Ellison-Glaeser (1997), or normalized Hirschman-Herfindahl index of concentration was calculated:

$$hhi_{\text{frs}} = \sum_{j=1}^{97}\left(\frac{N_{j,\text{frs}}}{N_{\text{frs}}} - \frac{N_j}{N}\right)^2$$

For each film-related service (frs) we know the number of relevant firms in each of Germany's 97 planning regions (*Raumordnungsregionen*)[7]. An industry would be considered as lacking local concentration completely if in each planning region j, the region's share in the national number of employees in the respective frs, i.e. $N_{j,frs}/N_{frs}$, equals its share of employees altogether, i.e. N_j/N. Then the term in brackets would be zero for every j, as would be the resulting measure of local sectoral concentration, hhi_{frs}. Actually this almost happens for pharmacists, whom one would expect to be distributed over the country almost like the entire population: the resulting hhi is 0.001.

[4] Coincidentally, the German Institute for Economic Research had done a lengthy survey of film producers just before I started working there, which is one reason why this study excluded the film producers in a narrow sense and focused on services needed for film production instead.
[5] Not counting 73 who were still in the database, but apparently non-existent at the time of the survey.
[6] Only 42 of the 436 responding firms (9.6%) belong to more than one category according to Kay Publishing (2001).
[7] *Raumordnungsregionen* are widely used for regional analysis in Germany; they comprise one or more NUTS III-regions that are linked by intensive commuting. Each of the four agglomerations which are most important for Germany's film industry (Berlin, Cologne, Hamburg, Munich), lies entirely within one planning region.

A more telling benchmark is mining, where a hhi of 0.097 results. Almost half of the services we investigate are more concentrated in space than mining, led by film lamps, 16mm camera rental and licensing agencies with an hhi of 0.343, 0.283 and 0.277, respectively.

Whereas the service(s) offered and the location are known for all firms, additional information was obtained from the survey respondents. Here we describe only those data which are used in regressions reported in the next two sections:

LONGADJUST is our proxy variable for measuring human capital specifity. It is a dummy variable which takes the value 1 if ten months or more are given as the typical period of vocational adjustment for new employees. (The question was: "For new employees, who are experienced in their occupation but new to your firm, typically a certain time span will pass until their productivity is comparable to that of their incumbent colleagues. Please try to estimate the number of month which is necessary for this.").

FIRMSIZE, defined as the number of employees subject to social insurance contribution.

OCCTRAINING: days of training per year and employee (on-the-job and off-the-job).

TURNOVER: labour turnover, here defined as the sum over the number of employees taken on and employees laid off in the last two years, divided by the total number of current employees.

FIXEDTERM: share of employees with fixed-term contracts.

FILM: percentage of sales to film industry (median 80, mean 64 percent).

Table 1 gives some descriptive statistics.

In section 3.4, TURNOVER, FILM, FIRMSIZE and LONGADJUST will be defined on the service level - e.g., the average size or average labour turnover rate of firms offering the respective service. This is necessary as the dependent variable, hhi_{frs}, is also defined on the service level. In the next section, however, investigating one hypothesis, we can also make use of the data on the firm level.

Table 1: Descriptive Statistics

Firm-level data:

variable	mean	median	min	max
Labour turnover	0.86	0.67	0	5
LongAdjust	0.51	1	0	1
Firmsize	10.6	2	0	500
FixedTerm	8.6	0	0	100
OccTraining	3.2	3	0	10
Agglomeration	0.62	1	0	1

Service level data (60 obs.):

hhi_{frs}	0.12	0.0985	0.038	0.343
Film	0.64	0.65	3.5	100
LongAdjust	0.33	0	0	1
MSize	51.2	29	10	380

3.3. Results on the firm level

Hypothesis 1, set out in section 2, claimed that the turnover rate is higher in (sectoral) agglomerations - or, as Storper and Scott (1990, p.582) put it, "the speed of rotation of workers through the local job system is likely to correlate positively with the size of the local labour market." Having data on the former (i.e. labour turnover), and approximating the size of the local labour market with a dummy variable AGGLOMERATION, which is 1 for Berlin, Cologne, Hamburg and Munich, and 0 for other locations of the firm, we can test this hypothesis, see Table 2.

Table 2: Results on the firm level - Explaining the labour turnover rate

Dependent variable: Labour turnover

	coefficient	t-statistic
LongAdjust	-0.3171473	-2.54
Firmsize	-0.0022376	-2.29
FixedTerm	0.0067969	2.36
OccTraining	-0.0987831	-2.04
Agglomeration	0.0441796	0.37
constant	1.159795	6.07

$R^2 = 0.14$

148 observations

(note: the number of observations is much lower than the number of responding firms, as labour turnover is not defined for firms with zero employees)

All explanatory variables but one show the expected impact. A longer period of vocational adjustment leads to a lower turnover rate; turnover is lower in larger firms (who can move workers between projects within the firm instead of taking them on when needed and laying them off when a major project is finished), and a lower turnover rate is observed for firms with more occupational training. The AGGLOMERATION dummy variable, however, is insignificant[8] - in this sense there is no support for the conjecture that firms with a high labour turnover rate prefer to locate where large labour markets are.

Though many coefficients are significant, considering the low R^2, the labour turnover rate is not very well explained by the data. One reason for this is the fact that certain benefits from turnover, which differ between the firms and the services, are not measurable for us. These benefits are due to the fact that in the cultural sector, "competition relies on the firms'

[8] This is also the case if we replace AGGLOMERATION by another dummy variable, taking the value 1 if the firm, according to our survey, considers one of the four cities in question as its ideal location if it had to chose anew.

capability to innovate, which in turn depends on the adequacy of skills and projects" (Benhamou 2000, p.308) - hence on a certain amount of turnover, at least for some firms.

Nevertheless, our results on the firm level can be seen as a first indication that something is working against the logic of the Marshallian labour pooling argument, which will be investigated more directly in the next section.

3.4. Results on the service level

What is the relationship between our proxy variable for human capital specificity, LONGADJUST, and local sectoral concentration? Regressing the former on the latter in the most simple manner, the following equation is obtained:

HHI = 0.05582 + 0.00069 Film + 0.04459 LongAdjust

(2.45) (2.02) (2.73)

R^2 = 0.21

60 observations

The coefficient of the variable FILM does not come as a surprise, as the one determinant of local concentration is the concentration of the demand side - in this case, these are the movie and television producers who need the various film-related services. However, not all services rely on film producers to an equal extent (e.g., you can book a stunt person or a pyrotechnician for your campus party), and those who have relatively more customers outside of the film business are less concentrated in space.

The positive coefficient of LONGADJUST indicates that firms are more inclined to locate close to one another if firm specificity of the relevant human capital is high - i.e. when poaching is less likely.

However, a major improvement of the above regression equation is possible. According to a conjecture by Combes and Duranton (2001, p.27), the incentives for poaching are higher in small product markets, i.e. markets with few competing firms. In this case the poaching firm would not only acquire additional human capital, it would also weaken a substantial part of its competitors (whereas this aspect would be negligible if the firm which loses an experienced

employee were just one of many). We try to capture this effect by constructing an interaction variable LONGADJUST*MSIZE. If its coefficient has a negative sign, then the impact of human capital specificity is larger, the smaller MSIZE, i.e., the number of firms is which offer the respective service. And this is indeed what we find, supporting the Combes and Duranton (2001) conjecture (see table 3 with standard error estimates being adjusted for heteroskedasticity using White's (1980) procedure).

Table 3: Explaining the regional concentration of film-related services

Dependent variable: hhi_{frs}

	coefficient	t-statistic	p
Film	0.005054	2.22	0.031
LongAdjust	0.106825	3.67	0.001
LongAdjust*MSize	-0.002562	-3.43	0.001
MSize	-0.000143	-1.97	0.054
constant	0.076287	5.38	<0.001

R^2 = 0.39

60 observations

t-statistics based on robust standard errors

By definition the dependent variable, hhi_{frs}, lies between 0 and 1; however. the actual values do not come close to these boundaries (see table 1), and inserting the observed values for FILM, LONGADJUST and MSIZE back into the regression equation from Table 3 does not result in predictions smaller than 0 or larger than 1.

Compared to the previous regression, the one reported in table 3 leads to the same interpretation with respect to hypothesis 2b: film-related services with higher human capital specificity tend to be *more* concentrated in space. If employees cannot easily move from one firm to another, then firms can "afford", so to speak, to locate close to one another.

4. Conclusions

It should be emphasized that our empirical results do not mean that the Marshallian labour pooling argument is wrong. Normatively, firms which are about to decide on their location should consider the advantage of a large local labour pool as well as the problem of poaching. The latter dominates, however, in the following sense: when human capital specificity is smaller, i.e. when both the pooling and the poaching issues are more relevant, then firms behave as if they were giving more weight to the latter.

We know of no other empirical work which investigates this question. However, if future work (say, on different industries) supports our conclusions, and if those who expect firm specificity of human capital to decrease are right, then this is bad news for the sectoral clusters.

References

Acemoglu, Daron and Jörn-Steffen Pischke (1998), Why Do Firms Train? Theory and Evidence, Quarterly Journal of Economics 113, 78-118

Aghion, Philippe, Peter Howitt und Giovanni L. Violante (2002), General Purpose Technology and Wage Inequality, Journal of Economic Growth 7, 315-345

Alecke, Björn, Christoph Alsleben, Frank Scharr and Gerhard Untiedt (2003), New Evidence on the Geographic Concentration of German Industries: Do High-Tech Clusters Really Matter?, mimeo: University of Dortmund

Autor, David H. (2001), Why Do Temporary Help Firms Provide Free General Skills Training?, Quarterly Journal of Economics 116, 1409-1448

Benhamou, Françoise (2000), The Opposition between Two Models of Labour Market Adjustment: The Case of Audiovisual and Performing Arts Activities in France and Great Britain over a Ten Year Period, Journal of Cultural Economics 24, 301-319

Betcherman Gordon, Norm Leckie and Kathryn McMullen (1998), Barriers to Employer-Sponsored Training in Canada, mimeo, http://www.rcrpp.ca/docs/work/bes_e.pdf

Cappelli, Peter (2002), Why Do Employers Pay for College?, NBER working paper 9225, http://www.nber.org/papers/w9225

Combes, Pierre-Philippe und Gilles Duranton (2001), Labour Pooling, Labour Poaching and Spatial Clustering, CEPR discussion paper 2975

Ellison, Glenn und Edward Ludwig Glaeser (1997), Geographic concentration in US manufacturing industries: a dartboard approach; Journal of political economy 105; 889 - 927

Kay Publishing (2001), Der Kay '01, Hamburg

Lindbeck, Assar und Dennis J. Snower (2000), Multitask Learning and the Reorganization of Work: From Tayloristic to Holistic Organization, Journal of Labor Economics 18, 353-376

Lindbeck, Assar and Dennis J. Snower (2001), Centralized bargaining and reorganized work: Are they compatible? European Economic Review 45, 1851-1875

Marshall, Alfred (1890), Principles of Economics, London: Macmillan

Mintzberg, Henry (1979), The Structuring of Organizations, Englewood Cliffs: Prentice-Hall

Moßig, Ivo (2002), The founding of new firms and efficient decision-making structures in localized production networks. The example of television production in the Cologne Media Cluster (Germany), mimeo: Paper prepared for the 42nd European Congress of the European Regional Science Association (ERSA), Dortmund (Germany), http://www.uni-giessen.de/mossig/ersa2002%20mossig.pdf

Scott, Allen J. (1984), Territorial reproduction and transformation in a local labor market: the animated film workers of Los Angeles, Environment and Planning D: Society and Space 2, 277-307

Stevens, Margaret (1996), Transferable training and poaching externalities, in: Alison L. Booth and Dennis J. Snower (eds.), Acquiring Skills. Market failures, their symptoms and policy responses, Cambridge University Press, 21-40

Storper, Michael (1989), The transition to flexible specialisation in the US film industry: external economies, the division of labour, and the crossing of industrial divides, Cambridge Journal of Economics 13, 273-305

Storper, Michael and Allen J. Scott (1990), Work organisation and local labour markets in an era of flexible production, International Labour Review 129, 573-591

White, Halbert (1980), A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity, Econometrica 48, 817-829

Wirtz, Ronald A. (2002), Shall we dance?, fedgazette (Federal Reserve Bank of Minneapolis), July 2002, http://minneapolisfed.org/pubs/fedgaz/02-07/dance.cfm